pendants shackled on before leaving port, it was with no little difficulty that make-shift rudder pendants were improvised; but by their means the ship has been steered across the Atlantic, the sails being trimmed to bring as little strain as possible on the rudder. The *Discovery* was lost sight of during a heavy gale on the 19th. During the passage, southerly winds prevailed. The spare rudder, itself badly sprung, has been repaired, and is in serviceable condition; when it is shifted the *Alert* will be ready to proceed to Portsmouth. Captain Stephenson, before parting company, was ordered to rendezvous at Queenstown.

In conclusion, it is my pleasing duty to inform you for the information of their Lordships, that one and all under my command have done their duty well and nobly, the utmost cordiality prevailing throughout the members of the Expedition from first to last. Capt. Stephenson has been a most valuable colleague, and I am much indebted to him for his friendly advice, and ready help on all occasions.

The executive officers have each been mentioned in the detailed reports of Capt. Stephenson and myself; their conduct when taxed to the utmost, under difficult and most distressing circumstances, is beyond all praise. Much as the attack of scurvy which visited us is to be regretted, it proved how valuable were the services of Fleet-Surgeon Thomas Colan, M.D., and Staff-Surgeon Belgrave Ninnis, M.D., who were so ably assisted by Surgeons Edward Lawton Moss, M.D., and Richard William Coppinger, M.D. These officers are each of great talent and high character, and have fully borne out the confidence imposed in them by the Medical Director-General; any reward that it is in the power of their Lordships to bestow on these gentlemen could not be given to more careful or zealous officers.

Lieuts. Lewis Anthony Beaumont and William Henry May, who voluntarily undertook the navigating duties in their respective ships, have performed that work most ably.

Lieuts. May and Robert Hugh Archer have charted the coast line from the entrance of Smith's Sound to the northward with great exactness; these officers have earned their Lordships' commendation.

The Expedition is much indebted to Mr. Thomas Mitchell, Assistant Paymaster-in-charge; the departure of the Assistant Paymaster of the *Alert* has much increased his work, as the only officer of his rank in the Expedition. In order the more readily to assist me, he performed a sledge journey in the early season from the *Discovery* to the *Alert*, and has since then divided his time between the two ships. He is a steady and trustworthy officer, and as such I recommend him for promotion. Mr. Mitchell and Mr. George White, Engineer, have made a most valuable collection of photographs of subjects connected with Arctic life and scenes.

The Engineers of the two ships have always most zealously assisted, like everyone else, in the general work, and fully occupied their spare time for the benefit of the Expedition.

Messrs. James Wootton and Daniel Cartmel deserve great praise for the invariable excellent order in which the engines under their charge have been kept, and for the careful economy of the coal supply, a vital point in Arctic exploration. Messrs. George White and Matthew Richard Miller are each careful and talented officers. I most confidently recommend the claims of these four gentlemen, who were voluntarily employed with the support sledges, to the favourable consideration of their Lordships.

The two ships' companies have conducted themselves in the most praiseworthy manner throughout; they are specially commendable for their resolute perseverance during the trying sledge journeys which have been already reported. Their good conduct and zeal entitles them to the most favourable consideration of their Lordships. A list of men specially deserving of and fit for advancement to higher rates will shortly be forwarded.

OUR ASTRONOMICAL COLUMN

The November Meteors.—The earth will arrive at the descending node of the first comet of 1866 (Tempel), in the track of which the meteors of the November period are found to travel, early on the evening of the 13th inst. The comet itself is approaching the point of nearest approximation to the orbit of Uranus, which planet, however, is always far removed from the comet during the present revolution. The distance from the earth on November 13 is 19·06, and from the sun 18·11, the mean distance of the earth from the sun being taken as unity; and were we able to reach the comet with our telescopes it would then be found rather more than one degree to the west of Antares. The obvious existence of more than one point of excessive condensation in this stream of meteors, necessitates a strict watch at each return of the earth to the nodal point, if we are to arrive at a clear knowledge of the law of distribution along the orbit, and as was remarked by M. Leverrier, "cela permettra de comprendre ces questions dans une théorie plus précise."

Herschel's First Glimpse of Uranus.—Herschel's first observation for position of this planet on the night of discovery, March 13, 1781, was made at 10h. 30m. M.T. at Bath, when he found it 2′ 48″ distant from a star which he calls α. For those who are curious in such matters it may be stated that the tabular place of Uranus at this time is in right ascension 5h. 35m. 48·2s., and north polar distance 66° 27′ 3″, whence it appears that Herschel's first comparison was made with the star Argelander Z. + 24°, No. 1067, estimated 9·5m.; the difference of one minute of arc, between the observed distance and that computed on reducing the star to March, 1781, being probably due to error of position in the "Durchmusterung." The log-distance of Uranus from the earth was 1·2774.

The Transit of Venus, 1882.—Prof. Bruhns has circulated the results of a new calculation of the circumstances of this transit, made from Leverrier's tables of sun and planet, on the method adopted by Hansen for the transit of 1874. These results, allowing for small differences in the semi-diameters employed, are quite in accordance with those previously published by Hind, Puisseux, &c. Prof. Bruhns hopes to issue a chart of the limiting curves in this transit, founded upon this new computation, before the end of the present year.

Mr. Knobel's Catalogue of the Literature of Sidereal Astronomy.—One of those exceedingly useful, but monotonous and laborious performances which exhibit the real zeal of the worker, occupies a large portion of the supplementary number of the "Monthly Notices" of the Royal Astronomical Society. It consists of a list of references to books, papers, &c., bearing upon the following subjects connected with stellar astronomy:—1. Double Stars, and the investigation of the orbits of Binary Systems; 2. Variable Stars; 3. Red Stars; 4. Nebulæ and Clusters; 5. Proper Motions; 6. Parallaxes of Stars; 7. Stellar Spectra; and, in the formation of this list, Mr. E. B. Knobel has had the advantage of the valuable library of the Royal Society, which is known to be remarkably rich in scientific transactions, &c., in addition to the library of the Royal Astronomical Society, to which numerous and important additions have been made of late years. In such a work it might not perhaps be difficult for any one who has interested himself in a particular branch of sidereal astronomy to suggest some addition which he would like to have seen incorporated. For instance, if a calculator of double-star orbits be looking up measures o α Centauri, he will find no reference to the valuable measures by Mr. E. B. Powell, at Madras, under his name.

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Mr. Knobel's statement that with one exception he has "personally examined every paper or book to which reference is made," will afford an idea of the expenditure of time and trouble involved in the production of his catalogue. By the way, the one exception refers to the "Sidereal Messenger," issued by the late Prof. O. M. Mitchell, while director of the Observatory at Cincinnati, which Mr. Knobel says is "not in the British Museum nor the libraries of the Royal Society and the Royal Astronomical Society." The writer is able to testify to a circumstance from his own experience, which may throw some light on the rarity of this periodical in our scientific libraries. He was one of a favoured few in this country to whom Prof. Mitchell sent the "Sidereal Messenger." It arrived through the post in one or more numbers at a time, but the postal arrangements with the United States not being then on the liberal footing of the present day, and Prof. Mitchell unluckily enveloping his journal in a stiff cover, heavy letter-postage was demanded for the successive deliveries. The demand increased on each occasion, until the presentation of one, which would have left but small change out of a sovereign, closed the writer's knowledge of the "Sidereal Messenger," and he has some recollection that the present Plumian Professor of Astronomy informed him at the time that his own receipt of the paper terminated about the same epoch, and for a similar reason. If this be a mistake, perhaps the periodical to its termination may be found in the library of the Cambridge Observatory. No. 4 contains the author's early measures of the companion of Antares, which he detected at Cincinnati, in 1845, with measures of η Coronæ and one or two other double stars of no particular interest. The "Sidereal Messenger" was not continued for any length of time.

METEOROLOGICAL NOTES

CLIMATE OF MANITOBA.—In the *Journal* of the Austrian Meteorological Society for October 1, there appears a valuable paper on this subject by Dr. A. Wojeikoff, based on observations made for a period of about five years at Winnipeg, the capital of this province of Canada. The results, a monthly *résumé* of which accompanies the paper, show a mean atmospheric pressure about three-tenths of an inch less in summer than in winter, and in consequence of the position of Manitoba with reference to the diminished pressure in the interior of the continent at this season, N. and N.W. winds prevail there 19 per cent. less, and N.E. E., S., and W. winds 26 per cent. more in summer than in winter. Leaving out September, the rainfall of which appears to be exceptional, May and June are the two rainiest months, and next to these come April and July, the rainfall of Winnipeg being in these respects closely analogous to that of the prairie region of the Western States. The rainfall for the year is only 22 inches. The greatest amount of cloud and the greatest relative humidity occur in November. The mean annual temperature is 34°·0, the coldest month January, being 0°·5, and the warmest July, 66°·7. The winter temperature is thus as cold as that of Archangel, but the summer temperature as warm as that of Paris. The high summer temperature and generous rainfall from April to July, the rainfall rising from 1·85 inches in April to 3·58 inches in June, mark the climate of Manitoba as admirably suited for the successful cultivation of wheat, barley, potatoes, turnips and other agricultural products of temperate regions. Dr. Wojeikoff draws an interesting comparison between the climates of the prairies of Manitoba and Minnesota on the one hand, and the Steppes of Western Siberia on the other, and shows that the seasonal distribution of temperature of Winnipeg is all but identical with that of Ischim, and that of St. Paul with Saratow. An important climatic difference must, however, be kept in view, viz., the summer rains are several weeks earlier in Manitoba than in Siberia.

SIROCCO AT PAU.—In the same number M. Piche, Secretary of the Meteorological Commission of the Lower Pyrenees, communicates a short notice of a sirocco which occurred in that part of France on September 1, 1874, during which the temperature rose at Biarritz to 101°·3, and the humidity fell to 38, the humidity falling still lower, or to 33, at Eaux-Bonnes. The extraordinary heat and dryness of the sirocco, which came from the south and south-east are attributed by M. Piche to the course it had pursued, that course being from Africa, across the Pyrenees, and thence down on Pau, this wind being thus quite analogous to the föhn of the Alps. The sirocco of the Lower Pyrenees being merely the in-draught towards a low atmospheric pressure accompanying a great storm which is advancing from the west, it follows that as soon as the wind veers to W. or to N.W., and consequently no longer crosses the Pyrenees before reaching Pau, it may be expected that the air will become instantly saturated with moisture, and rain begin to fall. This is just what takes place, and the connection between the sirocco and Atlantic storms is well recognised, and finds expression in the weather-prognostic current at Pau, "The drier the air the nearer the rain."

THE NORWEGIAN ATLANTIC EXPEDITION.—Prof. Mohn communicates to the *Bulletin International* an interesting note on the Norwegian scientific cruise of last summer. The hourly meteorological observations will not only be discussed with a view to ascertain the diurnal periods during the summer months, but also be compared with simultaneous observations made on land with the view of tracing the connection which subsists between the weather and its changes on sea and land respectively In addition to the observations usually made on board the navy of Norway, the humidity of the air, the evaporation from sea-water, the velocity of the wind, and the rainfall were observed. The zoological collection is rich and varied, many of the species found are new to science, and will necessitate the establishment of new genera. A valuable collection has been made of specimens of the sea-bottom taken at each sounding, of sea-water from the bottom and the surface, and of the rocks and minerals of Farö and Westmanna Island. The stormy character of the weather prevented magnetic observations being made on board, but such observations were very carefully made at Husö, in Sognefiord, Reykjavik, and Namsos in Norway. The expense of the cruise, inclusive of the instruments and apparatus, has been 165,000 francs—an expenditure which can only be regarded as liberal for such a country as Norway—and it is intimated to be the intention of the Norwegian Government to resume the prosecution of the researches in the next two years, extending them in the direction of Jan Magen and Spitzbergen.

BAROMETERS OF SOUTHERN RUSSIA.—M. Moritz, the eminent director of the Tiflis Observatory, makes an important communication to the *Bulletin International* of October 26, regarding the barometers of the stations in the south of Prussia. Prof. Wild, in the *Annals* of the Central Physical Observatory of St. Petersburg for 1874, states that the barometer at Tiflis is 0·028 inch lower than that at Nicolaieff. The determination of the true difference of the readings of these two barometers is of more importance than appears at first sight, because the barometers of all the Russian stations on the borders of the Black Sea have their errors determined by that of the barometer at Nicolaieff, or as it is technically phrased, are controlled by it, whereas all the barometers of the Caucasian Stations are controlled by that of Tiflis. Now these southern Russian Stations, taken as a whole, can supply data, unique of its kind, towards the solution of such questions of general meteorology as concerns the influence of large sheets of water and lofty mountain ranges on the state of the atmosphere and its movements, if only we be quite certain that the barometric readings at the numerous stations over the region are comparable with each other. During the past summer M. Moritz has made a careful comparison of the Tiflis

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